Scientists in the Courtroom: Basic Pointers for the Expert Scientific Witness

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The need for expert and unbiased participation in legal proceedings by physicians, industrial hygienists, toxicologists, environmental scientists, regulators, and similar professionals is hampered by lack of familiarity with the requirements of expert testimony and lack of oppportunities for professional training in this activity. Drawing on material developed in a continuing education course offered by the University of Washington, we describe the role and process of being an expert witness and provide basic information regarding good professional practices pertaining to the testifying expert role. *Key words*: ethics, expert witness, jurisprudence, litigation. *Environ Health Perspect* 102:668–672 (1994)

Why would anyone want to appear as an expert witness in a legal proceeding? The very thought conjures images of embarrassment, humiliation, or at least extreme anxiety. Yet, increasingly, scientists and other professionals are finding themselves listed as expert witnesses and asked to submit to interrogation by deposition and in many instances to direct and cross-examination at trial. Environmental health scientists may be sought as expert witnesses in many types of litigation, including "toxic torts" (where someone is seeking damages for injury or disease from a chemical exposure), zoning or land use issues involving hazardous wastes or industrial facilities, public policy and/or regulatory issues involving environmental hazards, regulatory compliance issues (e.g., OSHA, RCRA, FIFRA, and CERCLA violations), and insurance litigation over who pays for environmental damages.

Scientists with little or no experience in the courtroom are often uncomfortable testifying in deposition or trial and may be ill prepared for what follows. The view that courtrooms are a perilous environment for the inexperienced scientific witness is echoed in several recent articles on this subject, such as "Science in the Lion's Den" (*1*) and "Using Surprise to Capture the Expert Witness" (*2*). This concern is widely held, and in our view, is attributable to three major factors: 1) there are strong cultural differences between scientific and legal fact-finding, both in procedure and in approach, that make the courtroom a terrain unfamiliar to many scientists; 2) there is a related concern that taking part in legal matters as a paid witness is unsavory, even when the actual experience is successful (the "hired gun" image of testifying experts who will support any position for a fee); and *3*) there are few or no opportunities for scientists to receive education and training in the legal processes and performance expectations surrounding expert testimony.

We believe that participation of ethical and highly competent scientists is vital to resolution of technical matters in all kinds of arenas, including court proceedings, and that addressing the concerns described above through education will lead to better expert testimony and an improved standard of practice among experts. The following comments were originally developed as part of a 1-day continuing education course sponsored by the University of Washington School of Public Health, the Northwest Center for Occupational Health and Safety, and the Continuing Legal Education program of the University of Washington Law School. This course, attended by physicians, industrial hygienists, toxicologists, environmental scientists, regulators, and similar professionals, aimed to describe the role and process of being an expert witness and to provide basic information regarding good professional practices pertaining to the testifying expert role.

One of the most important fundamentals of effective expert testimony is to understand the process. Litigation or other court proceedings are not scientific activities; they are social activities characterized by competing advocates. The expert, while aiming at objectivity and impartiality, is useful to plaintiff or to defense attorneys to the degree that his or her testimony serves partisan ends. While in rare instances the objective truth might support only one side or the other, legal cases typically involve judgments based on multiple facts that are incomplete, inconsistent, or inconclusive. It is the role of the attorney to elicit those renderings of fact and opinion most supportive of his or her case and to undermine judgments that support the opposite view. It is the role of the expert to distinguish between expert opinion and speculation and to resist distortion of his or her testimony. At the same time, the expert must defer to the attorney regarding what questions will be directed at him or her and is confined to a reactive role. This balancing act is accomplished by establishing correct roles and relationships with the client/attorney at the outset of the activity and adhering to these thereafter, conscientiously preparing testimony regarding the scientific issues, and experience and/or training in giving testimony.

The following pointers are provided to the scientist who has never enjoyed the experience of testifying as an expert in deposition or trial. These represent our own opinions and perceptions based on personal experience.

Initial Contact with Attorney

If you take notes on the first contact, keep them very brief, factual, and do not include perceptions or opinions. The fewer notes, the better. It is acceptable to rely on your memory even if it is not very good.

When talking with the attorney for the first time, be a little skeptical (you don't have to show it, though). The attorney will generally make the case sound better than it may actually be. Remember, there are two sides to every story, and the attorney is an advocate, who by nature will try to sell you on his or her point of view. A good attorney won't try to convince you of the merits of the case.

Be reserved in your initial judgment. You may be asked on the spot for a preliminary opinion. It is all right to offer your first impressions (verbally), but use lots of qualifiers, as you probably have not heard or seen all of the facts of the case.

Play "devil's advocate" and attempt to find the weak points of the case (there is no need to be argumentative, but show your objectivity and thoughtfulness). Don't reinforce the attorney's perception about how great the case is, at least until you have had a chance to evaluate all of the facts, review the literature, and form a more thoughtful opinion. Pay attention to the tone and substance of the attorney's reaction to unfavorable feedback from you. While it is expected that he or she will look for ways to explain or counter the points, be wary of attorneys who do not want to hear bad news or who might attempt to put their expert in the uncomfortable position of supporting incorrect statements or analyses.

Keep in mind that once you have discussed the merits and facts of the case with one side or even received privileged information regarding one side's case, you cannot then work for the other, should you

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decline your invitation and then be contacted later by the other side.

The Agreement

Clearly define your role. You should not agree to be a testifying expert (i.e., expert witness) until you have had a chance to review the file. However, you may agree to be a consultant initially (un-named expert), and then decide whether you want to serve as an expert witness. Most cases involve several areas of expertise, and you must decide how far you are willing to go beyond your own narrow niche. This niche can be defined differently by different individuals. Some experts are willing to testify on nearly anything that is remotely related to their own discipline (e.g., a toxicologist testifying in a hazardous waste case on toxicity, groundwater movement, air dispersion modeling, epidemiology, environmental degradation, etc.), while others may choose to be narrowly focused (e.g., a toxicologist who is willing to testify only on the neurotoxic properties of certain pesticides, but not on any other aspects of toxicology or related disciplines). Define your role verbally (not in writing), but repeat it constantly if necessary, as the attorney may attempt to persuade you to extend your expertise beyond what you defined initially. It is important for you to have a clear understanding with the attorney as to exactly what you consider to be your area of expertise, and what you don't. Suggest other areas where the attorney needs to obtain other experts.

Tell the truth. Although there is sometimes an eagerness on the part of the expert to be helpful to the attorney, you are not doing anyone a favor by stretching your opinions to fit the case. The last thing an attorney wants to find out in the trial is that he or she has a lousy case. The stakes are high, and the cost of litigation is immense. Most attorneys want your honest appraisal of the strengths and weakness of the case as you see it. Even if the attorney strongly believes in the value of the case, you are not doing him or her any favor by supporting misperceptions if you believe the case is weak. The attorney would much rather find out sooner than later. The attorney may choose to find another expert, but you would not want to work on a case you couldn't honestly support. If you always tell the truth, you will never be embarrassed on the stand because of obvious contradictions in your testimony. Keep in mind that anything you have ever said in court, or have written anywhere, may find its way to the opposing council, to be revealed in all its glory to the jury. Never assume that the opposing council will not find that affidavit you wrote 5 years ago, or the deposition you had taken 7 years ago.

Subsequent Interactions

You will undoubtedly be sent large volumes of materials. If the case involves any medical claims, you can expect to receive volumes of unreadable medical records. The following pointers relate to the period in which you begin to formulate your opinion, which should be supported by fact (and the scientific literature).

Reviewing medical records, affidavits, answers to interrogatories, accident reports, and other largely nonscientific information relevant to the case. You may want to keep a list of materials sent to you, and when you received them. Do not, however, embellish the list with notes or comments. You will be asked when you received materials, from whom, and when you reviewed them. The listing can shorten the amount of time taken to go over this aspect.

Any tabs, underlining, highlighting, or marginal notes will be the subject of questioning, but this may be more useful than note-taking. Rather than writing notes (any of which are subject to discovery and questioning, and must be made available to the opposing counsel), you may want to highlight or underline pertinent materials. Keep all notes factual, and avoid writing down opinions or impressions (they may change later as more facts are revealed).

Frequently, you will be given summaries of medical records, answers to interrogatories, affidavits, etc., by your attorney. You may use these to organize your thoughts and reviews, but you should not rely solely on this biased, second-hand information for any of your opinions. If there are particular points made in the attorney's summary that are important to your opinion, verify that these facts are correct, that they are present in the material sent to you in original form, and make sure that you can honestly say that you have evaluated them directly.

Verify with your attorney that you have seen all of the pertinent records produced in the case. A few hours spent in the attorney's office scanning the case file can avoid some unpleasant surprises and may turn up facts whose value was not appreciated by the attorney (or paralegal assistant) who culled the file for you.

Reviewing scientific information. You will ultimately be responsible for ensuring that your review of pertinent literature is up to date and has not missed any important papers relevant to the case. Do not rely on the attorney for literature searches or to provide you with all of the key literature. Although you may dismiss certain nonsupportive papers as irrelevant or of minimal significance, you should not fail to mention them. Be prepared to discuss the limitations of nonsupportive literature honestly, as well as to acknowledge limitations of supporting data, should you be asked. You should know the basic facts of the key papers (especially those that the other side may use to support their position), but you do not have to know all of the literature off the top of your head. In deposition or trial, you can always ask to look at a specific paper if you are questioned about it. You do not, however, want that to be the first time you have ever seen it.

Again, the fewer notes, the better. However, it may be necessary and useful to keep some notes on specific papers. This is best done by using quotes from the authors, or highlighting data, rather than writing comments or summary opinions. The latter should come verbally (they'll be written down soon enough in deposition).

You will probably be asked to form opinions about a specific instance (for example, whether effect "A" was primarily the result of cause "B") and will base your opinion in part on specific information about the circumstances of the case. Clearly define what facts you accept and rely on as hypothetical and what facts you have determined to be the case. Hypothetical facts are often supported by other witnesses or evidence, and you may be asked about your basis for assuming these facts to be true. The attorney is often the conduit for transfer of these ideas between experts. It is a good idea to go to the source to get that expert's account of these facts, either by reading a deposition or affidavit, or by discussion. However, always consult your attorney before talking about the case with other experts. Some attorneys like to keep their experts compartmentalized, and it is a good idea to limit your discussion to the necessary specifics. You should never discuss the facts of the case with experts from the opposing side or with colleagues who are not involved in the litigation. However, direct discussion with other experts on the same team can eliminate confusion or inaccuracy and will also be a more credible approach than simply relying on the (non-expert) attorney for some crucial bit of technical information.

Form your opinions as methodically as you would in your research. Consider all the evidence. Ask where the evidence comes from. Qualify the evidence. Explicitly consider alternative conclusions and reasons for selecting the preferred one. Consider other expert opinion, but do not rely upon it as the basis of your opinion.

Other services to attorney and client. Safeguard your objectivity. Do not assume that you can maintain an impartial perspective on the case without working at it. The more involved you get in the matter, the more easily you can be swept up in the enterprise of mounting a case. Some activities that are particularly hazardous to your

detachment are: 1) taking part in strategy sessions with attorneys and other experts; 2) visiting with clients and providing direct consultation to them; 3) assisting attorneys in taking deposition or preparing for cross-examination of opposing experts. These may be useful, even necessary, activities in some instances, but guard against getting too personally or emotionally involved in the case.

One solution is to restrict your role to either consultant or testifier. This is difficult to do and may not be practical from the attorney's perspective. For experts without previous litigation experience, this might be a good idea, however. The other alternative is to engage in these consultative activities if appropriate, but with continual efforts to separate the consultant role from the impartial testifier role. Among other things, this means reminding the attorneys of your reservations, limitations, or outright unsupportive opinions. In particular, when preparing with the attorney for deposition or trial testimony, carefully review your positions and the boundaries of your testimony.

Characteristics of an Exemplary Scientific Witness

Ethical

- Has scientific integrity
- Safeguards his or her objectivity
- Maintains appropriate professional relationships with other litigation participants
- Differentiates between personal opinions and scientific fact

Expert

- Has a strong basis of professional training and experience: scholarship and teaching, research, clinical or practice-based experience, and written work
- Has complete knowledge of case issues
- Has complete knowledge of case data

Effective

- Has good communication skills
- Is skilled at question-and-answer forums
- Has appropriate courtroom demeanor

Comfortable

- Has knowledge of courtroom procedures
- Is prepared for cross-examination
- Is clear on opinions and basis for opinions

Performing testing or other technical work for litigation. You may be asked to perform laboratory tests, field studies, or other scientific investigations as part of litigation preparations. Although these activities may be identical to work that you do in your research, some additional considerations apply. You will need to take extra pains to document every aspect of the work—from receipt of samples to revision of draft copies of reports. You will need to become familiar with the requirements of legally defensible data, including chain of custody and physical security requirements for samples, laboratories, and data. You should not rely on normal practice or assumptions in many instances where you might do so in research work. For example, if you use a balance to weigh samples, you may be asked about calibration checks, preventive maintenance schedules, or specific training on balance operation you have provided to lab assistants or technicians. You may be asked to produce detailed lab records including written quality-control procedures. You will almost certainly be asked how your methods conform to established procedures and practices in your field and about verification of your methods and results by others. You should plan this work carefully with the attorney, especially if this is the first time you have performed testing for legal proceedings.

Performing original investigations can put you in a strong position to provide testimony. In addition, performing work under the constraints of the legal process may revise the way you view your research in general, in a beneficial way. Respect the challenge of working under legal scrutiny, rather than either avoiding it or underestimating it.

Preparing Affidavits or Other Forms of Written Opinions

Frequently, an attorney may want to submit an affidavit from you to the court to have a cased dismissed in summary judgment (e.g., based on lack of scientific and/or medical foundation). These are written forms of testimony under oath and may require the signature of a notary. The attorney will usually work closely with you on these and may tell you what they would like you to say. Although it is useful for you to frame your answers in a helpful way, the opinions must be yours, and you must guard against the attorney putting words in your mouth. Remember, this is a form of testimony, and you may be cross-examined on every detail of what you stated in the affidavit for years to come and in all kinds of subsequent cases. The level of detail and documentation included in affidavits will vary depending on the strategy of the attorney, the nature of the case, etc. Sometimes brief summary statements of your opinions, with little written documentation, may be requested. In other instances the affidavit may be in the form of a report, complete with detailed literature citations and reference to documents containing facts which you used to derive your opinion. The attorney will carefully review every word you write and will usually come back to you with suggested changes before it is submitted to the court. Be considerate of his or her concerns, but remember, it is your opinion, not the attorney's, and you must be comfortable with it.

Deposition

What to bring. Bring a copy of your most recent curriculum vitae to the deposition, unless you have provided one recently to the attorney. Frequently, you will be subpoenaed to appear, and the subpoena will contain global statements about what you must bring to the deposition (e.g., bring any materials you have used to formulate your opinions, including books, literature, medical records, reports, etc.). If one took this literally, your entire office could be construed as relevant. However, as an expert, you are allowed to give opinions based on experience in the field. You should bring any literature that is directly relevant to your opinions. If you have books or other materials you do not want to part with for a few weeks, bring copies of the relevant pages or chapters because the attorney will have it all copied and will generally keep the materials for 1–3 weeks. Many attorneys will want to look over what you brought before the deposition, so they don't have any surprises. Occasionally, some correspondence between attorney and expert can be considered privileged, and your attorney may remove that from your files before deposition. You will probably be asked if the attorney removed anything from your files, and generally anything you bring is discoverable by the other side. In addition to literature and supporting records, you will be asked to provide any notes, correspondence between you and your attorney, etc. If you brought it with you, it will likely be provided to the other side. It is important to discuss subpoenas or other requests for documents with your attorney. The attorney will help you to thoroughly and appropriately comply with the request.

Documenting your credentials. You will be questioned about details in your curriculum vitae, including talks you have given, articles you have written, and other cases you have testified in. You will probably be asked how many times you have testified, either in deposition or trial, what the nature

of the case was, your summary opinion (if the case was relevant), who retained you, etc. You may also be asked how many times you have testified for plaintiffs and how many times you have testified for defendants. If you keep a listing of your expert testimony in your curriculum vitae, you can expect to spend a lot of time going over this. Depending on the style of the attorney and his or her familiarity with you and your discipline, you may spend several hours going over credentials and past experiences as an expert.

Initial questioning. After your credentials have been carefully reviewed, you will be asked when you were first contacted about the case, who contacted you, what you were told, whether you formed or provided any opinions at that time, and if not, when you first formulated your opinions, and what materials you were provided (and when). Because of rules of evidence, it can be important to know exactly when you were contacted and when you were provided materials. Do your best to recall this, but do not resort to your calendar unless directed to do so. Do not say things like, "Oh, I probably have that information in my computer files, and I'm sure I can reconstruct it"—you will then have to provide the court with computer disks, opening up another avenue of investigation. It is best to rely on your memory, being as honest as you can.

The Ten Commandments of expert testimony. The opposing attorney will pose the questions to you. There are several basic rules you should always keep in mind when testifying (in deposition or trial):

1. Tell the truth.
2. Speak loudly, and answer all questions verbally (no head nodding or shaking).
3. Be courteous and professional, yet firm and confident. Don't appear overconfident, snide, or obnoxious, or you will pay for it later.
4. Don't volunteer anything; answer only the questions that you are asked. However, your answers must be responsive. Avoid being obstructive; for example, if you are asked, "Doctor, can you state your full name for the record?" don't answer "yes."
5. If you believe you have been misinterpreted, feel free to clarify or expand on a point, but keep your answer directed to the question.
6. Don't guess. If you don't know the answer, say you don't know. Avoid phrases like "I think" and "I guess." You may occasionally want to speculate on something, but in general you are better off by simply saying you don't know. If the question as posed is unanswerable or presumes incorrectly, say so. You should not help the attorney improve the question, but you may indicate the problem if you can do so simply.
7. Don't let the opposing attorney put words in your mouth. He or she will frequently rephrase what you said, often putting a slightly different slant to it. Listen carefully to what is said, and don't agree with the paraphrase unless you are completely comfortable with it (it will appear as your words, if you agree to it). Similarly, don't agree with distortions or misstatements included in a yes/no question, even if they don't seem to affect the answer: "Isn't it true, doctor, that your students got negative results for all of the 27 separate tests they performed?" Maybe the tests were all negative, but rather than saying "yes," you should restate the fact in a more balanced way: "I determined that the result of each of the tests performed under my supervision was negative."
8. Don't be argumentative, but stand by your statements if challenged.
9. Don't be distracted by the arguments and objections raised between attorneys. Frequently your attorney will object to a question, but once the objection is on the record, you will usually be instructed to go ahead and answer it. (Very rarely, an attorney may direct you not to answer a question). When objections are raised in a deposition, it is just like in court, except the judge is not there to rule immediately; a judge will later decide whether to sustain or overrule it. If it is sustained, the question and your answer will be stricken from the record.
10. Show proper respect for the judge, attorneys, jury, and the process. You always stand when the judge and jury enter or leave the courtroom. You should address the judge as "your honor," attorneys as "counsel" or "Mr. Doe" (not first names).

You will generally be provided with a copy of your deposition testimony and an opportunity to make corrections. Read the transcript carefully. Corrections should largely be of phonetic errors on the part of the recorder (which can substantially change or invert the meaning). Do not use this opportunity to enlarge or add new aspects to your answers. If you discover statements that might have been misleading or misinterpreted, note these and be prepared to clarify them at trial if necessary.

Testifying in Trial

In general, all of the rules noted above for deposition testimony are relevant to trial testimony. In addition, there are several other important pointers:

1. Speak directly to the jury (or judge if there is no jury)—don't focus continually on the attorney(s), although obviously you will frequently be addressing him or her directly as well. Your credibility in the eyes of the jury is greatly enhanced if they see you as an educator and scientist, rather than as a hired gun.
2. Avoid jargon or technical terms. (At deposition, the opposing attorney will be well versed in the subject matter and generally will understand the jargon—a jury will not.) Explain things as simply as possible, but don't oversimplify if it misrepresents what you want to say. Use examples where possible. Don't volunteer information that is not directly relevant to the question that was asked.
3. Keep your cool. Consider the deposition as the attorney's warm-up for the main bout. He or she has sized you up, found your weak points and has every intention of going for the knockout. Be courteous and not argumentative.
4. Use charts and graphs prepared in advance (and/or conceptualized in advance). Your attorney will instruct you on how to do this. If you prepare them yourself, make sure that the

Suggested Reading

Brent RL. The irresponsible expert witness: a failure of biomedical graduate education and professional accountability. Pediatrics 70:754–761 (1984).

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writing is very large. Overhead and slide projectors and other audiovisual materials can be made available, if necessary, but they are often awkward to use in the courtroom. Large poster boards are generally best. Although professional-looking graphics may be impressive, the hand-drawn chart or illustration, done "on the spur of the moment" on a flip chart, is often more effective, especially if you can help the jury understand what you are doing (just like the classroom).

5. Courtroom procedure is similar to deposition procedure, but the judge will rule on any disputes as they arise. Should there be an objection before or in the middle of your answer, stop talking immediately and wait for the judge to direct you to continue. Be sure to finish your answer if allowed to.

About Money

Financial arrangements are a somewhat delicate subject. Many first-time expert witnesses want to know how much to charge, what to expect in terms of promptness of payment, what tasks are covered, and so on. At the same time, no expert wants to be perceived as being "for sale" or overly concerned with money matters, so many are reluctant to raise these matters with the attorney. Some general pointers in this area are 1) Seek advice from your colleagues about financial terms. Gillis provides some general information about fees (*3*). 2) Be careful to clarify any questions about your fee schedule, the terms, or how much your efforts might cost with the attorney. If the attorney does not raise this question, you should. It is helpful to provide an estimate of how much time you think your efforts will require and to provide updates as needed. 3) It is unethical for an expert to work on a contingent basis, as this creates a financial interest in the outcome of the case. 4) Expect to be asked by the opposing side how much you have been paid for your work. A forthright and nondefensive answer will minimize the issue.

Closing Comments

Serving as an expert witness can be a stimulating, enjoyable, educational, and professionally rewarding experience. Because of the requirements of the task, the scientist learns a great deal about his or her own discipline, as well as how science is used in the legal system. Clearly, the biggest disadvantage to serving as an expert witness is the "hired gun" image. Unfortunately, if this perception prevents well-qualified experts from getting involved, the courts are left with less than the best. As the number of highly reputable scientists willing to serve as expert witnesses increases, the whole system benefits. The science presented to the courts is better, the image of the scientist as expert witness gains additional credibility, and ultimately the whole process of interjecting good science into the courtroom is enhanced. In spite of the adversarial nature of litigation, the vast majority of attorneys are courteous and respectful of the credible scientist, even if their objective may be to discredit the expert's opinion. Thus, while the process can be intimidating, there are many positive aspects, and serving as an expert witness is truly a public service which can provide many personal and social rewards.

References

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2. Seaman SM, Martin JF. Using surprise to capture the expert witness. For the Defense (April) 19–26 (1993).
3. Gillis AM. Science in the courtroom: efforts afoot to improve the quality of expert testimony. Bioscience 42:2–7 (1992).